

Appendix 3-C

Shower House Pad Vegetation

And Reference Area

Introduction

The following pages are a copy of a report prepared by Patrick Collins, Ph.D., Biologist/Reclamation Specialist, of Mt. Nebo Scientific. The report presents an evaluation of the existing vegetation in the area of the shower house pad and information on the reference area for the shower house pad. The vegetation survey was performed in October, 1992 for the shower house pad and September, 1993 for the reference area.

***VEGETATION OF THE
PROPOSED SHOWERHOUSE AREA
FOR THE CO-OP MINE***



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Dates

Field Work: Proposed Disturbed Area - October 1992
Reference Area - September 1993

Reports: Proposed Disturbed Showerhouse Area- December 1992
Proposed Disturbed & Reference Area - June 1994

TABLE OF CONTENTS

INTRODUCTION	1
General Site Description	1
METHODS	2
Cover and Composition	3
Woody Species Density	3
Sample Adequacy	4
Photographs	4
Raw Data	4
RESULTS	5
Proposed Disturbed Showerhouse Area	5
Reference Area	6
SUMMARY TABLES	7-12
COLOR PHOTOGRAPHS13-15
RAW DATA16-24

**VEGETATION OF THE
PROPOSED DISTURBED SHOWERHOUSE
AND REFERENCE AREAS
FOR THE CO-OP MINE**

INTRODUCTION

Following are results from vegetation sampling of a reference area and an area that was proposed for disturbance by the CO-OP Mining Company. An earlier report was submitted (December 1992) showing baseline data of the proposed disturbed area with a commitment by the operator to select a reference area the following year. A reference area was later chosen by the operator and approved by the Division of Oil, Gas & Mining (DOGM) to be used as a standard of revegetation success. The reference area was sampled in 1993. The summarized data are reported in this document.

To facilitate comparisons of the proposed disturbed and reference areas, both sets of data and summaries were included in this report.

General Site Description

The proposed disturbed area is the site of the showerhouse

to be constructed by the CO-OP Mining Company in Bear Canyon. Total area of the site was estimated to be 1.84 acres with a southeast exposure and slopes ranging between 1 and 5 degrees.

An area of about 1 acre was designated as the reference area for the proposed disturbed showerhouse area. The reference area had approximately the same slope, exposure and vegetation as the proposed disturbed area.

The vegetative community of each area could be described as a transition zone between the pinyon-juniper hillsides and the sagebrush/grass alluvial bottomlands. Soils are generally deep and well-drained. The area is also used extensively by deer and other wildlife.

METHODS

Quantitative and qualitative data were taken from the proposed disturbed and reference areas. Sampling was accomplished on October 10, 1992 for the proposed disturbed area and September 3, 1993 for the reference area.

Cover and Composition

Vegetation sampling was conducted in an attempt to adequately describe the sample areas. Two - 200 ft. transects were randomly placed within each area. Along these transects, points were placed at 10 ft intervals. At each 10 ft mark, random numbers between 1 and 15 (ft.) were then chosen to place the quadrats perpendicularly on each side of the transect line.

Understory cover estimates were made using ocular methods with meter square quadrats. Species composition and relative frequencies were also assessed from the quadrats. Additional information recorded on data sheets were: estimated precipitation, slope, exposure, grazing use, animal disturbance and other appropriate notes. Plant nomenclature follows A Utah Flora (Welch et al. 1987).

Woody Species Density

Density of woody plant species were recorded using the point quarter distance method (from Cottom and Curtis 1956) in the same areas described in the cover section above. In the point quarter method, random points were placed on the sample sites and measured into four quarters. The distances to the nearest woody plant species were then recorded in each quarter. The average

point-to-individual distance was equal to the square root of the mean area per individual.

Sample Adequacy

Sampling adequacy for cover and density was achieved by employing formulas from Snedocor and Cochran (1980), insuring that 80% of the samples were within 10% of the true mean. The formulas are shown on the summary tables.

Photographs

Color photographs were taken of the proposed disturbed and reference area plant communities and included in this report.

Raw Data

Raw data from which the summary tables are based are included at the end of this report.

RESULTS

Proposed Disturbed Showerhouse Area

Total living cover of the proposed disturbed showerhouse area was estimated at 46.13%. Woody species and grasses dominated the area constituting 42.64% and 56.48%, respectively (Table 1). The most common shrub by cover and frequency was big sagebrush (*Artemisia tridentata*). Most common grass by cover was needle-and-threadgrass (*Stipa comata*), whereas, the most frequently observed grass was Indian ricegrass (*Stipa hymenoides*) (Table 2). Forb species were seldom observed in the sample quadrats.

Woody species density was also calculated in the area. Big sagebrush was clearly the most important species by density, comprising nearly 85% of the total 1,960 individuals per acre on the site (Table 3).

Reference Area

Total living cover of the reference area was estimated at 53.88%. Woody species and grasses dominated the area constituting 29.75% and 68.07%, respectively (Table 4). Again, the most common shrub by cover and frequency was big sagebrush.

As in the proposed disturbed area, the most common grasses by cover and frequencies were needle-and-threadgrass and Indian ricegrass (Table 5). Forb species were seldom observed in the sample quadrats.

Woody species density was calculated in the area. Broom snakeweed (*Gutierrezia sarothrae*) and big sagebrush were the most important species by density, comprising 1,535 and 1,217 individuals per acre, respectively, (Table 6).

TABLE 1: Total cover and composition summary for the proposed disturbed showerhouse area of the CO-OP Mine.

TOTAL COVER	% MEAN COVER	STANDARD DEVIATION	SAMPLE SIZES
Living Cover*	46.13	9.97	40
Litter	18.60	12.92	40
Bareground	23.20	15.28	40
Rock	12.08	13.14	40
COMPOSITION			
Shrubs	42.64	26.63	40
Forbs	0.88	4.17	40
Grasses	56.48	26.20	40

* Sample was measured using the formula below:

$$nMin = \left[\frac{1.28 (s)}{x (.1)} \right]^2$$

where,

x = sample mean,

s = standard deviation,

nMin = minimum samples required to insure 80% accuracy within 10% of the true mean.

TABLE 2: Species cover and frequency summary for the proposed disturbed showerhouse area of the CO-OP Mine.

SPECIES	% MEAN COVER	STANDARD DEVIATION	SAMPLE SIZE	RELATIVE FREQUENCY
SHRUBS				
<i>Artemisia tridentata</i>	11.25	9.92	40	70.00
<i>Brickellia microphylla</i>	0.13	0.78	40	2.50
<i>Chrysothamnus nauseosus</i>	0.38	1.73	40	5.00
<i>Juniperus osteosperma</i>	5.25	13.27	40	20.00
<i>Opuntia polyacantha</i>	0.50	1.87	40	7.50
<i>Pinus edulis</i>	2.00	7.97	40	10.00
FORBS				
<i>Lepidium montanum</i>	0.13	0.78	40	2.50
<i>Sphaeralcea grossulariaefolia</i>	.25	1.56	40	2.50
GRASSES				
<i>Bouteloua gracilis</i>	1.00	6.24	40	2.50
<i>Elymus spicatus</i>	0.63	3.90	40	2.50
<i>Elymus salinus</i>	1.63	5.74	40	15.00
<i>Stipa comata</i>	14.75	15.29	40	65.00
<i>Stipa hymenoides</i>	8.25	9.12	40	70.00

TABLE 3: Woody species densities for the proposed disturbed showerhouse area of the CO-OP Mine.

	NUMBER/ACRE
<i>Artemisia tridentata</i>	1,649.99
<i>Brickelia microphylla</i>	16.34
<i>Echinocereus triglochidiatus</i>	16.34
<i>Gutierrezia sarothae</i>	16.34
<i>Juniperus osteosperma</i>	130.69
<i>Opuntia polyacantha</i>	65.35
<i>Pinus edulis</i>	65.35

TOTAL	<u>1,960.40*</u>

* Sample was measured using the formula below:

$$nMin = \left[\frac{1.28 (s)}{x (.1)} \right]^2$$

where,

x = sample mean,

s = standard deviation,

nMin = minimum samples
required to insure 80%
accuracy within 10% of
the true mean.

TABLE 4: Total cover and composition summary for the showerhouse reference area of the CO-OP Mine.

TOTAL COVER	% MEAN COVER	STANDARD DEVIATION	SAMPLE SIZES
Living Cover*	53.88	9.84	40
Litter	13.93	6.92	40
Bareground	26.48	12.55	40
Rock	5.73	3.77	40
COMPOSITION			
Shrubs	29.75	22.27	40
Forbs	2.18	6.57	40
Grasses	68.07	22.25	40

* Sample was measured using the formula below:

$$nMin = \left[\frac{1.28 (s)}{x (.1)} \right]^2$$

where,

x = sample mean,

s = standard deviation,

nMin = minimum samples
required to insure 80%
accuracy within 10% of
the true mean.

TABLE 5: Species cover and frequency summary for the showerhouse reference area of the CO-OP Mine.

SPECIES	% MEAN COVER	STANDARD DEVIATION	SAMPLE SIZE	RELATIVE FREQUENCY
SHRUBS				
<i>Artemisia tridentata</i>	7.38	10.90	40	50.00
<i>Ceratoides lanata</i>	4.38	7.76	40	30.00
<i>Chrysothamnus nauseosus</i>	0.75	4.68	40	2.50
<i>Gutierrezia sarothrae</i>	4.13	6.79	40	35.00
<i>Opuntia polyacantha</i>	0.25	1.56	40	2.50
FORBS				
<i>Circium</i> sp.	0.13	0.78	40	2.50
<i>Lepidium montanum</i>	0.38	1.73	40	5.00
<i>Machaeranthera canescens</i>	0.38	1.32	40	7.50
<i>Tragopogon dubius</i>	0.13	0.78	40	2.50
GRASSES				
<i>Bouteloua gracilis</i>	1.25	4.97	40	7.50
<i>Elymus salinus</i>	9.50	12.79	40	52.50
<i>Stipa comata</i>	12.25	10.95	40	72.50
<i>Stipa hymenoides</i>	13.00	9.60	40	77.50

TABLE 6: Woody species densities for the showerhouse reference area of the CO-OP Mine.

	NUMBER/ACRE
<i>Artemisia tridentata</i>	1217.08
<i>Ceratoides lanata</i>	820.20
<i>Chrysothamnus nauseosus</i>	58.92
<i>Gutierrezia sarothae</i>	1534.58
<i>Juniperus osteosperma</i>	79.37
<i>Opuntia polyacantha</i>	58.92
<i>Pinus edulis</i>	58.92

TOTAL	<u>3,827.99*</u>

* Sample was measured using the formula below:

$$nMin = \left[\frac{1.28 (s)}{x (.1)} \right]^2$$

where,

x = sample mean,

s = standard deviation,

nMin = minimum samples
required to insure 80%
accuracy within 10% of
the true mean.

COLOR PHOTOGRAPHS



PROPOSED DISTURBED SHOWERHOUSE AREA



SHOWERHOUSE REFERENCE AREA

RAW DATA SHEETS

CO-OP MINE

Prop. Dist. Showerhouse

Exposure: S

Slope: 2 - 4 deg

Sample Date: 10 Oct 1992

1.00 2.00 3.00 4.00 5.00 6.00 7.00 8.00 9.00 10.00

TREES & SHRUBS

Pinus edulis	0.00	0.00	0.00	5.00	0.00	0.00	0.00	0.00	0.00	0.00
Artemisia tridentata	0.00	0.00	15.00	10.00	15.00	10.00	30.00	15.00	25.00	5.00
Juniperus osteosperma	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	25.00
Brickellia microphylla	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Opuntia polyacantha	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Chrysothamnus nauseosus	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

FORBS

Sphaeralcea grossulariaef	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Lepidium montanum	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

GRASSES

Stipa comata	30.00	30.00	25.00	10.00	25.00	35.00	15.00	30.00	40.00	0.00
Stipa hymenoides	0.00	10.00	5.00	10.00	5.00	5.00	5.00	0.00	0.00	10.00
Elymus salinus	0.00	0.00	0.00	0.00	5.00	0.00	0.00	0.00	0.00	0.00
Bouteloua gracilis	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Elymus spicatus	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

COVER

Total Living Cover	30.00	40.00	45.00	35.00	50.00	50.00	50.00	45.00	65.00	40.00
Litter	10.00	20.00	10.00	25.00	10.00	10.00	20.00	20.00	20.00	10.00
Bareground	50.00	35.00	40.00	35.00	35.00	15.00	10.00	15.00	5.00	25.00
Rock	10.00	5.00	5.00	5.00	5.00	25.00	20.00	20.00	10.00	25.00

% COMPOSITION

Shrubs	0.00	0.00	33.33	42.86	30.00	20.00	60.00	33.33	38.46	75.00
Forbs	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Grasses	100.00	100.00	66.67	57.14	70.00	80.00	40.00	66.67	61.54	25.00

23.00	24.00	25.00	26.00	27.00	28.00	29.00	30.00	31.00	32.00	33.00	34.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
20.00	0.00	20.00	20.00	15.00	35.00	20.00	0.00	5.00	10.00	5.00	0.00
0.00	35.00	0.00	0.00	0.00	5.00	0.00	0.00	15.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	5.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	5.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	10.00	0.00	0.00	0.00	0.00
30.00	5.00	35.00	20.00	0.00	5.00	0.00	5.00	0.00	25.00	0.00	0.00
10.00	5.00	0.00	10.00	25.00	0.00	5.00	25.00	30.00	20.00	10.00	40.00
5.00	0.00	0.00	0.00	0.00	5.00	5.00	0.00	0.00	0.00	35.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
65.00	50.00	55.00	50.00	40.00	50.00	35.00	40.00	50.00	55.00	50.00	40.00
29.00	10.00	20.00	45.00	10.00	40.00	5.00	10.00	10.00	35.00	5.00	5.00
5.00	30.00	24.00	3.00	45.00	5.00	5.00	45.00	39.00	5.00	25.00	35.00
1.00	10.00	1.00	2.00	5.00	5.00	55.00	5.00	1.00	5.00	20.00	20.00
30.77	70.00	36.36	40.00	37.50	80.00	71.43	0.00	40.00	18.18	10.00	0.00
0.00	10.00	0.00	0.00	0.00	0.00	0.00	25.00	0.00	0.00	0.00	0.00
69.23	20.00	63.64	60.00	62.50	20.00	28.57	75.00	60.00	81.82	90.00	100.00

CO-DP MINE
 Prop. Dist. Showerhouse
 Exposure: 5
 Slope: 2 - 4 deg
 Sample Date: 10 Oct 1992

35.00	36.00	37.00	38.00	39.00	40.00	Mean	SDev	Freq	
									TREES & SHRUBS
0.00	0.00	0.00	0.00	25.00	5.00	2.00	7.97	16.00	Pinus edulis
0.00	0.00	0.00	0.00	0.00	0.00	11.25	9.92	70.00	Artemisia tridentata
30.00	65.00	5.00	0.00	0.00	0.00	5.25	13.27	20.00	Juniperus osteosperma
0.00	0.00	0.00	0.00	0.00	0.00	0.13	0.78	2.50	Brickellia microphylla
0.00	0.00	10.00	5.00	0.00	0.00	0.50	1.87	7.50	Opuntia polyacantha
0.00	0.00	0.00	0.00	5.00	10.00	0.38	1.73	5.00	Chrysothamnus nauseosus
									FORBS
0.00	0.00	0.00	0.00	0.00	0.00	0.13	0.78	2.50	Sphaeralcea grossulariaefol
0.00	0.00	0.00	0.00	0.00	0.00	0.25	1.56	2.50	Lepidium montanum
									GRASSES
0.00	0.00	0.00	5.00	0.00	0.00	14.75	15.29	65.00	Stipa comata
5.00	0.00	20.00	0.00	5.00	0.00	8.25	9.12	70.00	Stipa hymenoides
0.00	0.00	0.00	0.00	0.00	0.00	1.63	5.74	15.00	Elymus salinus
0.00	0.00	0.00	40.00	0.00	0.00	1.00	6.24	2.50	Bouteloua gracilis
0.00	0.00	0.00	0.00	0.00	25.00	0.63	3.90	2.50	Elymus spicatus
									COVER
35.00	65.00	35.00	50.00	35.00	40.00	46.13	9.97		Total Living Cover
45.00	25.00	10.00	5.00	5.00	5.00	18.60	12.92		Litter
15.00	5.00	30.00	35.00	35.00	45.00	23.20	15.28		Bareground
5.00	5.00	25.00	10.00	25.00	10.00	12.08	13.14		Rock
									% COMPOSITION
85.71	100.00	42.86	10.00	85.71	37.50	42.64	26.63		Shrubs
0.00	0.00	0.00	0.00	0.00	0.00	0.88	4.17		Forbs
14.29	0.00	57.14	90.00	14.29	62.50	56.48	26.20		Grasses

CD-OP MINE

Trail Canyon

Shower House Ref Area

PJ/Sagebrush/Grass

Exposure: SE

Slope: 1 - 3 deg

Sample Date: 3 Sept 1993

TREES & SHRUBS

	1.00	2.00	3.00	4.00	5.00	6.00	7.00	8.00	9.00	10.00	11.00
Artemisia tridentata	25.00	10.00	10.00	10.00	30.00	25.00	25.00	0.00	40.00	0.00	10.00
Ceratoides lanata	0.00	25.00	15.00	10.00	10.00	0.00	5.00	0.00	0.00	0.00	10.00
Gutierrezia sarothamiae	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.00	0.00	5.00	0.00
Opuntia polyacantha	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Chrysothamnus nauseosus	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

FORBS

Lepidium montanum	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Macraeranthera canescens	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tragopogon dubius	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Cirsium sp.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

GRASSES

Stipa comata	15.00	20.00	20.00	10.00	25.00	15.00	10.00	10.00	10.00	0.00	25.00
Bouteloua gracilis	5.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Stipa hymenoides	0.00	0.00	20.00	10.00	0.00	10.00	0.00	10.00	15.00	25.00	10.00
Elymus salinus	0.00	0.00	0.00	0.00	0.00	0.00	20.00	35.00	0.00	40.00	0.00

COVER

Total Living Cover	45.00	55.00	65.00	40.00	65.00	50.00	60.00	60.00	65.00	70.00	55.00
Litter	10.00	10.00	20.00	10.00	10.00	20.00	25.00	10.00	20.00	10.00	24.00
Bareground	40.00	30.00	10.00	40.00	20.00	25.00	10.00	25.00	10.00	15.00	20.00
Rock	5.00	5.00	5.00	10.00	5.00	5.00	5.00	5.00	5.00	5.00	1.00

% COMPOSITION

Shrubs	55.56	63.64	38.46	50.00	61.54	50.00	50.00	8.33	61.54	7.14	36.36
Forbs	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Grasses	44.44	36.36	61.54	50.00	38.46	50.00	50.00	91.67	38.46	92.86	63.64

12.00	13.00	14.00	15.00	16.00	17.00	18.00	19.00	20.00	21.00	22.00	23.00	24.00	25.00
5.00	0.00	10.00	0.00	0.00	0.00	0.00	5.00	0.00	5.00	5.00	0.00	0.00	0.00
0.00	0.00	20.00	0.00	0.00	0.00	0.00	0.00	25.00	5.00	0.00	10.00	0.00	0.00
0.00	5.00	0.00	0.00	0.00	20.00	10.00	0.00	25.00	0.00	0.00	0.00	0.00	10.00
0.00	0.00	0.00	10.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	5.00	0.00	0.00	10.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	5.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	5.00	0.00	10.00	0.00	0.00	0.00	0.00	10.00	0.00	10.00	25.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10.00	20.00	0.00	25.00	30.00	20.00	15.00	20.00	15.00	25.00	20.00	35.00	25.00	20.00
25.00	15.00	40.00	5.00	30.00	0.00	0.00	10.00	0.00	10.00	5.00	5.00	15.00	0.00
40.00	40.00	70.00	50.00	50.00	50.00	40.00	40.00	65.00	45.00	40.00	50.00	50.00	55.00
9.00	5.00	20.00	10.00	20.00	10.00	10.00	25.00	10.00	10.00	15.00	10.00	15.00	5.00
50.00	45.00	5.00	35.00	15.00	35.00	40.00	30.00	20.00	35.00	40.00	35.00	30.00	35.00
1.00	10.00	5.00	5.00	5.00	5.00	10.00	5.00	5.00	10.00	5.00	5.00	5.00	5.00
12.50	12.50	42.86	20.00	0.00	40.00	25.00	12.50	76.92	22.22	12.50	20.00	0.00	18.18
0.00	0.00	0.00	10.00	0.00	0.00	37.50	12.50	0.00	0.00	0.00	0.00	0.00	0.00
87.50	87.50	57.14	70.00	100.00	60.00	37.50	75.00	23.08	77.78	87.50	80.00	100.00	81.82

26.00	27.00	28.00	29.00	30.00	31.00	32.00	33.00	34.00	35.00	36.00	37.00	38.00
0.00	25.00	5.00	5.00	0.00	5.00	0.00	0.00	5.00	0.00	0.00	35.00	0.00
25.00	0.00	0.00	0.00	15.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	10.00	15.00	15.00	20.00	0.00	15.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	30.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.00	0.00	0.00	0.00	5.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	5.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
15.00	25.00	25.00	15.00	5.00	25.00	10.00	20.00	35.00	25.00	0.00	5.00	45.00
0.00	20.00	25.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10.00	0.00	0.00	10.00	5.00	15.00	15.00	10.00	0.00	10.00	25.00	0.00	10.00
0.00	0.00	0.00	10.00	40.00	5.00	10.00	10.00	0.00	5.00	15.00	0.00	0.00
50.00	70.00	55.00	45.00	65.00	60.00	50.00	55.00	65.00	40.00	55.00	70.00	60.00
5.00	10.00	10.00	30.00	5.00	25.00	10.00	25.00	25.00	10.00	15.00	20.00	10.00
20.00	15.00	30.00	20.00	25.00	10.00	30.00	15.00	5.00	45.00	25.00	5.00	29.00
25.00	5.00	5.00	5.00	5.00	5.00	10.00	5.00	5.00	5.00	5.00	5.00	1.00
50.00	35.71	9.09	11.11	23.08	25.00	30.00	27.27	38.46	0.00	27.27	92.86	0.00
0.00	0.00	0.00	11.11	0.00	0.00	0.00	0.00	7.69	0.00	0.00	0.00	8.33
50.00	64.29	90.91	77.78	76.92	75.00	70.00	72.73	53.85	100.00	72.73	7.14	91.67

CO-OP MINE
 Trail Canyon
 Shower House Ref Area
 PJ/Sagebrush/Grass
 Exposure: SE
 Slope: 1 - 3 deg
 Sample Date: 3 Sept 1993

39.00 40.00 Mean SDev Freq

TREES & SHRUBS

0.00	0.00	7.38	10.90	50.00	Artemisia tridentata
0.00	0.00	4.38	7.76	30.00	Ceratoides lanata
5.00	5.00	4.13	6.79	35.00	Gutierrezia sarothrae
0.00	0.00	0.25	1.56	2.50	Douglas polyacantha
0.00	0.00	0.75	4.68	2.50	Chrysothamnus nauseosus

FORBS

0.00	0.00	0.38	1.73	5.00	Lepidium montanum
0.00	0.00	0.38	1.32	7.50	Machaeranthera canescens
0.00	0.00	0.13	0.78	2.50	Trigonopogon dubius
0.00	0.00	0.13	0.78	2.50	Cirsium sp.

GRASSES

10.00	10.00	12.25	10.95	72.50	Stipa comata
0.00	0.00	1.25	4.97	7.50	Bouteloua gracilis
5.00	25.00	13.00	9.60	77.50	Stipa hymenoides
30.00	0.00	9.50	12.79	52.50	Elymus salinus

COVER

50.00	40.00	53.88	9.84	Total Living Cover
4.00	10.00	13.93	6.92	Litter
45.00	45.00	26.48	12.55	Bareground
1.00	5.00	5.73	3.77	Rock

% COMPOSITION

10.00	12.50	29.75	22.27	Shrubs
0.00	0.00	2.18	6.57	Forbs
90.00	87.50	68.07	22.25	Grasses